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PAIWA STREET DRAIN
PRELIMINARY SOIL REPORT

WAIPAHU, OAHU, HAWAII
TAX MAP KEY: 9-4-02, 09 & 26

To:
COMMUNITY PLANNING, INCORPORATED

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

MAY 11, 1972

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

WALTER LUM
EDWARD WATANABE
EZRA KOIKE
WALLACE WAKAHIRO
3020 WAIALAE AVE., HONOLULU, HAWAII 96816 • TEL. 737-7931

May 11, 1972

MR. GEORGE HOUGHTAILING
Community Planning, Inc.
700 Bishop Street, Suite 608
Honolulu, Hawaii 96813

Dear Mr. Houghtailing:

Subject: Paiwa Street Drain
Preliminary Soil Report
(for foundation design purposes)
Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-02, 09 & 26

Transmitted herewith is our soil exploration report for foundation design purposes for the drain line and structures of the proposed Paiwa Street Drain at Waipahu, Oahu, Hawaii.

The report includes a Boring Location Plan, the boring logs, laboratory test results, recommendations and limitations.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

Ezra Koike

Ezra Koike
Professional Engineer
Hawaii No. 1450

EK:vl

C O N T E N T S

PAIWA STREET DRAIN
PRELIMINARY SOIL EXPLORATION

WAIPAHU, OAHU, HAWAII
TAX MAP KEY: 9-4-02, 09 & 26

SCOPE OF EXPLORATION

The purpose of this exploration was to determine general soil conditions for design purposes for the proposed Paiwa Street Drain in Waipahu.

This report includes field explorations, laboratory tests and general foundation design recommendations for the drain line and structures.

FIELD EXPLORATION

Paiwa Street drain will run along Paiwa Street and the proposed Paiwa Street Extension.

Five exploratory borings were made for the drain line under the existing Paiwa Street, east of Waipahu Street (Boring Nos. 6 thru 9). Three borings previously made for Paiwa Street Extension and 2 borings made for the Haul Cane Road which runs parallel to Paiwa Street Extension are attached.

The borings made for this report were made with 4-in. diameter augers using a carbide drag bit. Soil samples were obtained with 2 and 3-in. thin-wall tube samplers and a 2-in. standard split spoon sampler driven with a 140-lb hammer falling 30 inches.

LABORATORY TESTS

Laboratory tests included: natural water content, unconfined compression, torvane shear and Atterberg limit. A summary of the laboratory test results is given in Table IA.

SOIL CLASSIFICATION SYSTEM

Soil samples were visually observed and subjected to appropriate tests in the laboratory. Based on visual observations and laboratory tests, the soil descriptions given on the boring logs are generally made in accordance with the "Unified Soil Classification System."

GENERAL SITE CONDITIONS

The proposed Paiwa Street Drain which will run along Paiwa Street is planned to begin from about 1,000 ft west of the intersection of Paiwa Street and Waipahu Street and will extend in an easterly direction to the existing drainage canal next to Waipahu Park, a length of about 3,000 ft of drain line.

East of Waipahu Street, Paiwa Street is paved; west of Waipahu Street, Paiwa Street Extension will be constructed.

One and 2-story wood frame and concrete block buildings, utility lines, concrete block and rock walls and chain link fences line both sides of the existing Paiwa Street.

A natural drainageway crosses in a southeasterly direction near the west end of the drain line.

Old plantation residences are presently located along the portion of the alignment that is west of Waipahu Street.

INTERPRETATION OF SOIL CONDITIONS

From the field exploration and laboratory test results, the soils may be generally described as follows:

Portion of Site West of Waipahu Street

Stiff clayey silts and silty clays ("MH" soils) to about 15 to 20-ft depths at the beginning of the project, and less stiff towards Waipahu Street.

Water was not noted in the borings.

Portion of Site East of Waipahu Street (Existing Paiwa Street)

A pavement section of about 2 in. of A.C. over 8-in. base course underlain by layers of medium to stiff clayey silts and silty clays.

At about the invert level, the soil conditions are erratic. Some sand pockets were noted in Boring No. 6.

In general, below the invert, the underlying soils seem to become softer towards the drainage canal.

At the east end near the drainage canal, soft pockets of peaty and organic clays and silts ("PT, OH" soils) were noted in Boring No. 9 from about 8 to 15 ft or more in depth. Probing at the bottom of the drill hole indicated soft layers to about 35-ft depths.

Water was encountered at about invert levels at Boring Nos. 7, 8 and 9.

For more detailed descriptions of soils encountered in the borings, refer to the boring logs.

DISCUSSION AND RECOMMENDATIONS

A drain line, about 3,000 ft long, is proposed. The invert of the drain line will generally vary from about 8 to 12 ft below street level.

The borings generally indicate that the proposed drain line would probably rest on medium to stiff silty clay and clays west of Waipahu Street, on medium to soft silty clays east of Waipahu Street, and on soft organic material at the eastern end near the canal.

Mass grading work, particularly the construction of fills in the western section along the proposed Paiwa Street Extension, should be done before the construction of the drain line.

Utility lines in the vicinity of the existing plantation homes and along the existing section of Paiwa Street should be verified prior to start of construction. Relocation or removal and backfilling of existing lines should be considered.

Because of existing roadways, walls, utility lines and structures along the route of the drain line, excavation and dewatering should be done with care. The excavations should be supported sufficiently during construction to minimize settlement of the surrounding ground and to avoid damaging existing structures and utility lines.

Drain Line

For the section west of Waipahu Street, the drain line and structures may be placed on a 6-in. gravel blanket. For the portion east of Waipahu Street, a 12-in. gravel blanket is recommended. Where water is encountered at invert level, a 24-in. thick gravel blanket is recommended.

Soft or organic soils, when encountered, should be removed to firm ground if practicable or to 4 ft below the bottom of the drain line and structures.

The thicknesses given above are general guidelines. In some localized situations, the thicknesses may be varied upward or downward depending upon field conditions.

The gravel blanket should consist of fairly well-graded granular material about 3/4-in. maximum sizes with less than 10% passing No. 200 sieve.

For drain line foundations resting on compacted gravel lining, bearing values of about 1000 p.s.f. may be used.

For lateral earth pressures on the side walls of drain structures, an equivalent fluid pressure of about 75 p.c.f. may be used assuming some drainage of the backfill is provided. In addition, vehicle or other surcharge loads should be considered.

Weep holes are recommended near the bottoms of drain line and structures to minimize the possible buildup of hydrostatic pressure.

For the construction of the drain, the following precautions should be considered:

1. Excavations, particularly along developed areas, should be done carefully to minimize damages to the roadway and the existing utilities, walls and structures. Construction in small increments in well-braced sections or other means to minimize ground movements should be considered.

2. Equipment and heavy loads should be kept away from the tops of excavations. The ground adjacent to or near the tops of excavations should be continually observed for cracks or dips in the ground as this may give warning where local sloughing might occur.

   Adjustments in work methods may be required in localized areas.

3. Where dewatering is to be done, it should be done with care to minimize ground movements and disturbances to the surrounding ground and structures. Dewatering should be done without moving soil (pump clear water).

Unforeseen Conditions

Unforeseen or undetected conditions such as soft spots and abandoned utilities may occur in localized areas and will have to be adjusted and corrected in the field as they are detected.

Adjustments in work and shoring methods should be made for localized conditions.

BORING LOGS

The stratification lines shown on each of the boring logs represent the approximate boundary between soil types and the transition may be gradual.

Symbols

Symbols used generally are in accordance with the Unified Soil Classification System.

Where a parenthesis "(MH)" is used, the soil sample was classified by visual observation of the sample recovered.

Where no parenthesis "MH" is used, the soil sample was classified from either the Atterberg limit or sieve analysis test results.

PAIWA ST.

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET DRAIN
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-09 & 26

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 6 Sheet No. ____ of ____
Driller W.LUM ASSOC., INC. Date FEB. 14, 1972
Field Party MAESHIRO, RADOVICH
Type of Boring AUGER (ACKER ACE) Diam. 4"
Elev. ____ Datum ____
Drill Bit T.C. DRAG

Water Level	13.0'	NOT NOTICED
Time	2:45 PM	11:45 AM
Date	2-14-72	2-15-72

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	2" A.C.	0								
	8" BASE COURSE			G-A	-	27	-	-	-	30/.5'
(MH)	STIFF, BROWN CLAYEY SILT W/ SAND & DECOMPOSED ROCK									
		5								
(MH)	STIFF, BROWN W/GRAY SILTY CLAY			G-B	-	41	-	-	-	
		10		G-C	-	47	-	-	-	
(MH)	SOFT, BROWN CLAYEY SILT W/ TRACES OF SAND		WATER 2-14-72 ▽							
		15		G-D	-	61	-	-	-	
	END OF BORING @ 16.5'									

PAIWA STREET

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET DRAIN
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-09 & 26

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 7 Sheet No. _____ of _____
Driller W. LUM ASSOC., INC. Date FEB. 14, 1972
Field Party MAESHIRO, RADOVICH
Type of Boring AUGER (ACKER ACE) Diam. 4"
Elev. _____ Datum _____
Drill Bit T.C. DRAG

Water Level	8.0'	6.5'			
Time	12:00 NOON	11:45 AM			
Date	2-14-72	2-15-72			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	2" A.C.	0								
	8" BASE COURSE			T-A	-	25	-	-	-	30/.5'
(SM)	DENSE, BROWN SILTY SAND									
(MH)	STIFF, BROWN CLAYEY SILT W/ TRACES OF SAND	5	WATER 2-15-72	T-B	-	32	-	-	-	30/.4'
SM	DENSE, BROWN SILTY SAND W/GRAVEL	10		T-C	34	33	47	-	-	40/.3'
(SM)	LOOSE, BROWN W/GRAY SILTY SAND	15		T-D	-	55	-	-	-	
	END OF BORING @ 16.5'									

PAIWA ST.

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET DRAIN
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-09 & 26

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" S. 2" O.D. THIN WALL TUBE
2" SS. 2" STANDARD SPLIT SPOON

BORING NO. 8 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: FEB. 11, 1972
Field Party: MAESHIRO, RADOVICH
Type of Boring: AUGER (MOBILE B-30) Diam.: 4"
Elev.: ____ Datum: —
Drill Bit: T.C. DRAG

Water Level	11.0'	7.0'	
Time	-	11:45AM	
Date	2-11-72	2-15-72	

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40	PENETRATION DATA: 2" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5'
	2" A.C. 8" BASE COURSE	0	2"SS	B-A	-	35	-	-	-		
(MH)	SOFT, REDDISH BROWN CLAYEY SILT W/ TRACES OF SAND										
(MH)	SOFT, REDDISH BROWN SILTY CLAY	5	2"S WATER 2-15-72	B-B	-	36	-	-	-		1/.5' 1/.5'
MH	MEDIUM, GRAY & BROWN SILTY CLAY	10	2"S	B-C	35	55	76	2060	-		2/.5' 3/.5'
(MH)	STIFF, BROWN CLAYEY SILT W/TRACES OF SAND	15	2"S	B-D	-	43	-	4270	-		3/.5' 6/.5'
(MH)	MEDIUM, BROWN CLAYEY SILT W/ SAND	20	2"SS	B-E	-	48	-	-	-		
(SM)	BROWN & DARK GRAY SILTY SAND	25	2"SS	B-F	-	48	-	-	-		
	END OF BORING @ 31.5'	30	2"SS	B-G	-	42	-	-	-		

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET DRAIN
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-09 & 26

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2"SS-2" STANDARD SPLIT SPOON; 2"S-2" O.D. THIN WALL TUBE

BORING NO. 9 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date FEB. 10, 1972
Field Party MAESHIRO, OSHIRO, RADOVICH
Type of Boring AUGER (MOBILE B-30) Diam. 4"
Elev. ____ Datum ____
Drill Bit T.C. DRAG

Water Level	7.5'				
Time	11:45 AM				
Date	2-15-72				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40	PENETRATION DATA: 2" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5'
	2" A.C.	0									
	1.5' BASE COURSE										
(MH)	MEDIUM, MOTTLED BROWN SILTY CLAY W/TRACES OF SAND & GRAVEL		2"SS	9-A	-	41	-	-	-		
MH	SOFT, REDDISH BROWN SILTY CLAY W/TRACES OF SAND & GRAVEL	5	2"S WATER 2-15-72	9-B	49	49	99	-	-		1/.5' 2/.5'
	COBBLE										
PT	PEAT	10	2"S	9-C	105	198 475+	248	1500	-		1/.5' 1/.5'
(OH)	SOFT, BLACK ORGANIC CLAYS & SILTS										
	END OF BORING @ 16'	15	2"S	9-D	-	72	-	940	-		1/1.5'
		20								ONE BLOW/4.0'	
		25								2 BLOWS/1.0'	
		30									
	END OF PENETRATION @ 35.5'	35									12/.5'

CONTINUOUS PENETRATION TEST W/ 2" DIA. BLUNT POINT

PAIWA STREET

WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET DRAIN

LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-09 & 26

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 3" O.D. THIN WALL TUBE

BORING NO.: 9-A Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: FEB. 15, 1972

Field Party: MAESHIRO, RADOVICH, COLLURA

Type of Boring: AUGER (ACKER ACE) Diam.: 4"

Elev.: ____ Datum: —

Drill Bit: T.C. DRAG

Water Level				
Time	—			
Date	2-15-72			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40	PENETRATION DATA: 3" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5'
		0									
		5									
		10									
(OH)	SOFT, BLACK ORGANIC CLAYS & SILTS			9A-A	-	83	-	-	200		1/.5' 1/.5' 1/.5' 1/.5'
		15									
(PT)	PEAT			9A-B	-	194 483	-	-	-		3/.5' 2/.5' 3/.5' 2/.5'
	END OF BORING @ 17'										

PAIWA STREET DRAIN

TABLE I A - SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	7	8	9	9
SAMPLE NO.	C	C	B	C
DEPTH BELOW SURFACE	10'-10.3	10'-11'	5'-6'	10'-11'
DESCRIPTION	BROWN SILTY SAND W/GRAVEL	GRAY & BROWN SILTY CLAY	REDDISH-BROWN SILTY CLAY W/TRACES OF SAND & GRAVEL	PEAT
GRAIN-SIZE ANALYSIS (% Passing) Sieve				
1"				
1/2"				
#4				
#10				
#20				
#40				
#100				
#200				
ATTERBERG LIMITS				
Air Dried or Natural	NATURAL*	NATURAL	NATURAL	NATURAL
Liquid Limit	47	76	99	248
Plastic Limit	34	35	49	105
Plasticity Index	13	41	50	143
Dilatancy	QUICK	NONE-SLOW	MEDIUM	QUICK
Toughness	SLIGHT-MED.	MED.-HIGH	MEDIUM	SLIGHT
Dry Strength	SLIGHT-MED.	MED.-HIGH	MED.-HIGH	SLIGHT
UNIFIED SOIL CLASSIFICATION	SM	MH	MH	PT.
APPARENT SPECIFIC GRAVITY				
EXPANSION AND CBR TESTS (Surcharge-51 P.S.F.)				
Molding Moisture, %				
Molding Dry Density, P.C.F.				
Swell upon saturation, %				
CBR at 0.1" Penetration				
MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-57 Method ___)				
Dry to Wet or Wet to Dry				
Max. Dry Density (P.C.F.)				
Optimum Moisture (%)				

REMARKS:

* SAMPLE TESTED ONLY ON THAT PORTION THAT PASSES #40 SIEVE

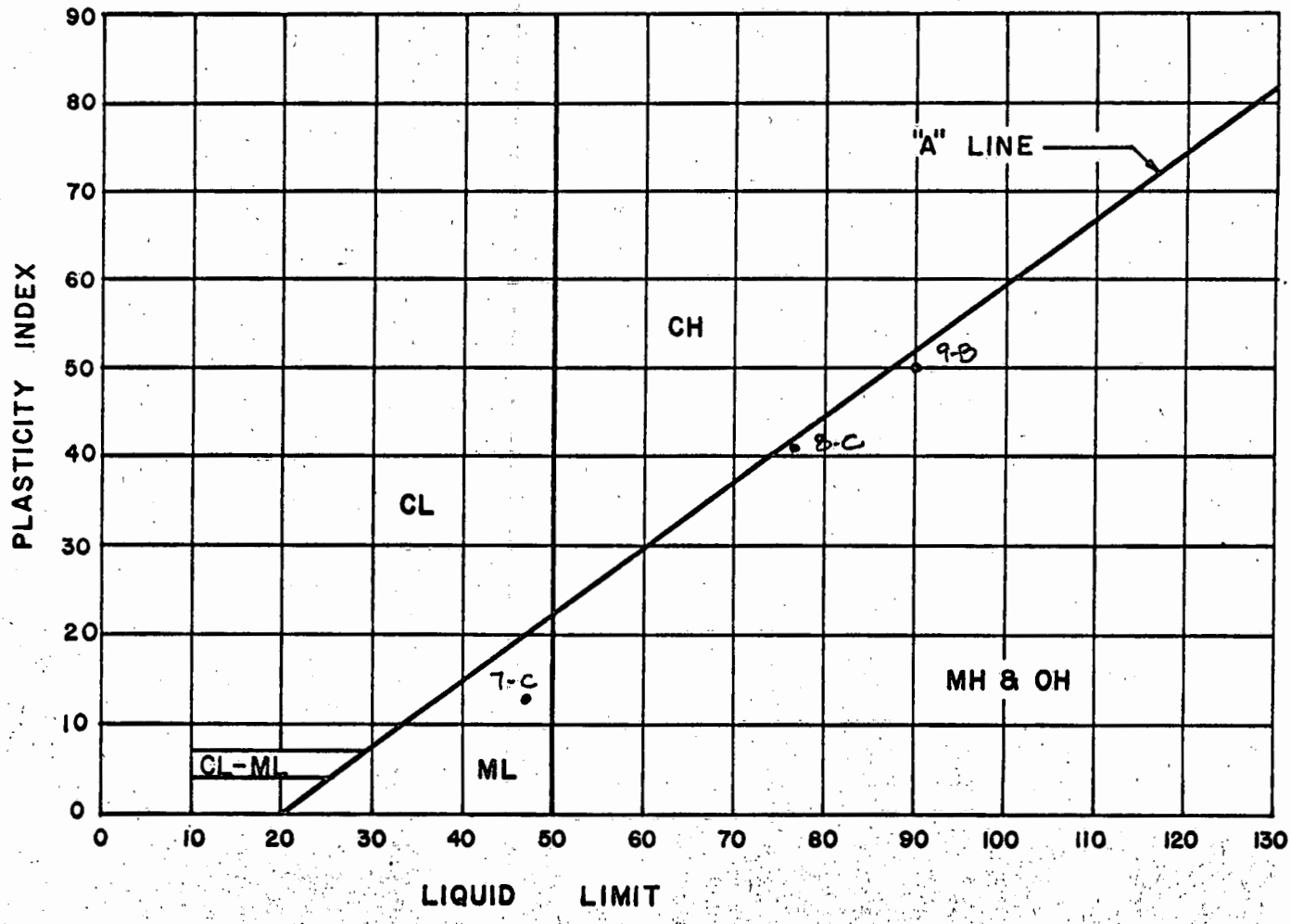
WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 3-23-72 By BT

PLASTICITY CHART

PROJECT: PAIWA STREET DRAIN

LOCATION: WAIPAHU, OAHU, HAWAII



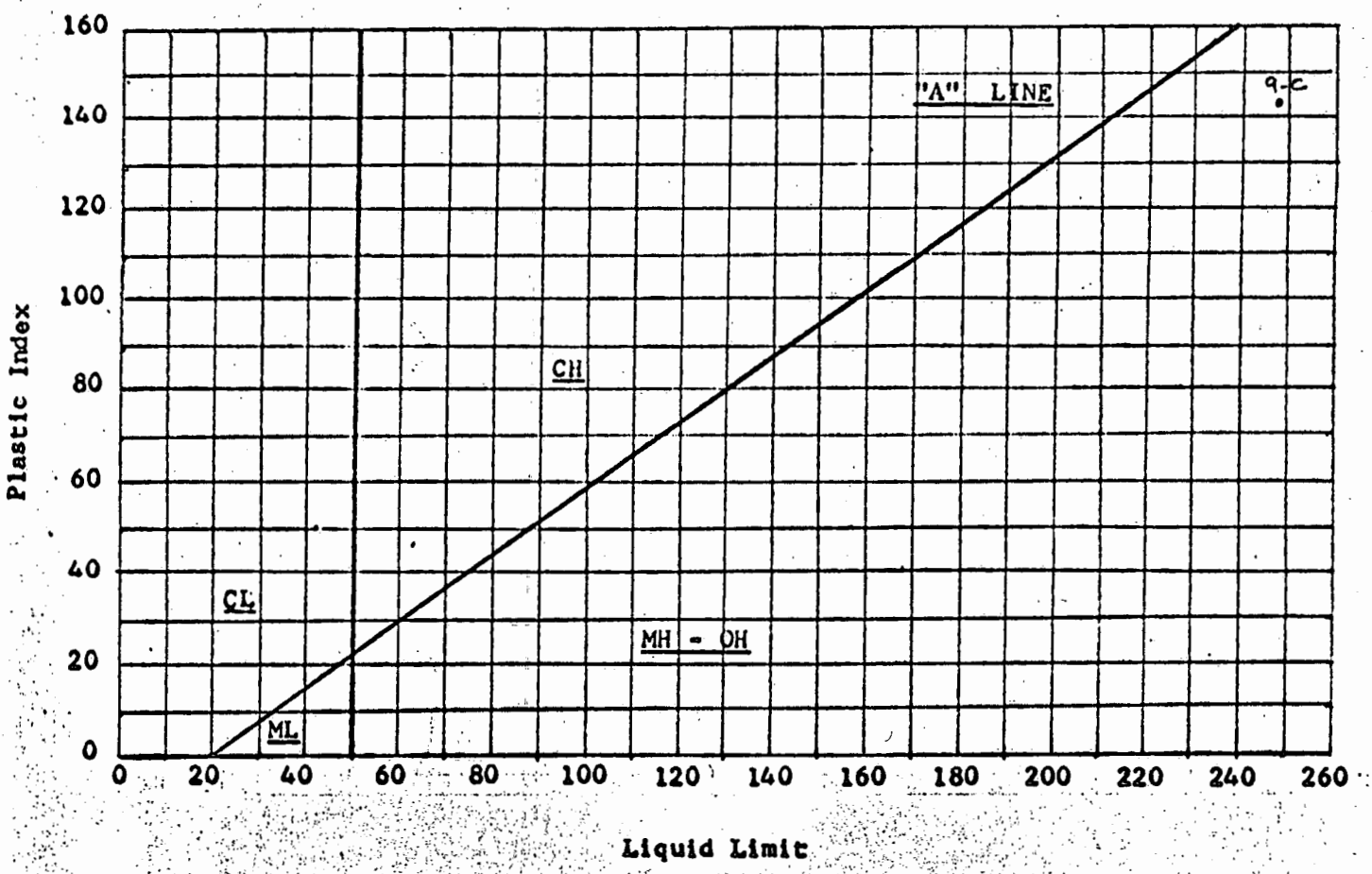
WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

DATE 3-23-72 BY BT

PLASTICITY CHART

PROJECT: PAIWA STREET DRAIN

LOCATION: WAIPAHU, OAHU, HAWAII



WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

LOGS OF BORINGS

FROM

"PAIWA STREET EXTENSION"

REPORT DATED APRIL 13, 1972

AND

"PROPOSED HAUL CANE ROAD IN WAIPAHU"

REPORT DATED DECEMBER 29, 1971

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT PAIWA STREET EXTENSION

LOCATION Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-02: Por. 3 & 4

HAMMER:
Weight 10# SLEDGE HAMMER
Drop

SAMPLER: 2" DIA. BLUNT POINT

SOUNDING ~~BORING~~ NO. 3 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date JAN. 11, 1972
Field Party KAKU, RADOVICH
Type of Boring CONTINUOUS PENETRATION Diam. 2"
Elev. 69'± * Datum —
Drill Bit

Water Level					
Time					
Date					

PENETRATION DATA
~~Standard~~ CONTINUOUS Penetration Test
10# SLEDGE HAMMER
N (Blows per foot)
0 10 20 30 40

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	Penetration Data
	ELEV. = 69'± *	0								PUSH / 1.0'
	END OF PENETRATION @ 2.5'	5								

* ELEVATION ESTIMATED FROM PRELIM. PLAN DATED AUG. 6, 1971

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET EXTENSION
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-02: Por. 3 & 4

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2"S - 2"O.D. THIN WALL TUBE
2"SS - 2" STANDARD SPLIT SPOON

BORING NO. 4 Sheet No. ____ of ____
Driller W.LUM ASSOC., INC Date JAN. 11, 1972
Field Party KAKU, RADOVICH
Type of Boring ACKER ACE Diam. 4"
Elev. 66'± * Datum —
Drill Bit T.C. DRAG
Water Level NOT NOTICED
Time —
Date 1-11-72

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40	PENETRATION DATA: 2"O.D THIN WALL TUBE SAMPLE BLOWS/.5'
	ELEV. = 66'± *?	0									
	A.C. GRAVEL, SAND, CORAL & BROWN SILTY-CLAY										
ML	SOFT BROWN CLAYEY SILT		2"S	4-A	30	37	49	—	—		3/.5', 3/.5'
	MEDIUM DARK GRAY & BROWN	5									
CH	CLAY		2"SS	4-B	26	32	67	—	—		
	MEDIUM, BROWN	10									
CH	CLAY		2"S	4-C	28	29	58	6,930	—		6/.5', 10/.5'
	STIFF, GRAY & BROWN	15									
(MH)	SILTY CLAY		2"SS	4-D	—	34	—	—	—		40
	END OF BORING @ 16.5'	20									

*ELEVATION ESTIMATED FROM PRELIM. PLAN DATED AUG. 6, 1971

PAIWA STREET

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PAIWA STREET EXTENSION
LOCATION: Waipahu, Oahu, Hawaii
Tax Map Key: 9-4-02: Por. 3 & 4

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 5 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date FEB. 15, 1972
Field Party MAESHIRO, RADOVICH, COLLURA
Type of Boring AUGER (ACKER ACE) Diam. 4"
Elev. ____ Datum ____
Drill Bit T.C. DRAG

Water Level				
Time	—			
Date	2-15-72			

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	0.5' COBBLES, SAND & CLAYEY SILT	0								
(MH)	STIFF, RED - BROWN CLAYEY SILT W/ TRACES OF SAND			5-A	—	24 28	—	—	—	
(MH)	STIFF, MOTTLED BROWN SILTY CLAY	5		5-B	30	32	48	—	—	
ML	MEDIUM, MOTTLED BROWN CLAYEY SILT									
(MH)	SOFT TO MEDIUM MOTTLED BROWN SILTY CLAY	10		5-C	—	45	—	—	—	
		15		5-D	37	63	79	—	—	
MH	MEDIUM, MOTTLED GRAY-BROWN SILTY CLAY									
		20		5-E	—	60	—	—	—	
	END OF BORING @ 21.5'									

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT: PROPOSED HAUL CANE ROAD IN WAIPAHU
LOCATION: From Interstate H-1 to Aualii St. Waikele, Ewa, Oahu, Hawaii

HAMMER: Weight 140# Drop 30"
SAMPLER: 2" S.S. 2" O.D. THIN WALL TUBE; 2" SS. 2" STANDARD SPLIT SPOON

BORING NO. 4 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date OCT. 15, 1971
Field Party SUZUKI, RADOVICH, MAESHIRO, KAKU
Type of Boring AUGER (ACKER & B-30 ACE) Diam. 3"
Elev. 82'± * Datum —
Drill Bit T.C. DRAG
Water Level NOT NOTICED
Time —
Date 10-16-71

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40	PENETRATION DATA: 2" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5'
	ELEV. = 82'± *	0									
(MH)	STIFF, REDDISH BROWN CLAYEY SILT		2"SS	4-A	-	21	-	-	-		
(MH)	MEDIUM, REDDISH BROWN CLAYEY SILT	5	2"SS	4-B	-	-	-	-	-		75/.5'
	ROCK OR BOULDER										
	MEDIUM, REDDISH BROWN CLAYEY SILT	10	2"S	4-C	-	21	-	-	-		8/.5' 14/.5'
					(UNABLE TO EJECT SAMPLE)						
	STIFF, LIGHT BROWN CLAYEY SILT	15									
(MH)	STIFF, MOTTLED REDDISH BROWN, SILTY CLAY		2"SS	4-D	-	23	-	-	-		26/.5'
ML	STIFF, BROWN CLAYEY SILT & TRACES OF DECOMPOSED ROCK	20	2"SS	4-E	32	30	42	-	-		28/.5'
	STIFF REDDISH BROWN & BROWN CLAYEY SILT & DECOMPOSED ROCK	25	2"SS	4-F	-	38	-	-	-		40/.5'
	BOULDER	30	2"SS	4-G	-	-	-	-	-		50/.0' HAMMER BOUNCES

* ELEVATION ESTIMATED FROM PROFILE DATED AUG. 10, 1971

CANE HAUL ROAD

WALTER LUM ASSOCIATES, INC. 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

Boring Log

PROJECT PROPOSED HAUL CANE ROAD IN WAIPAHU

LOCATION From Interstate H-1 to Aualii St.
Waikele, Ewa, Oahu, Hawaii

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 5 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date OCT. 21, 1971

Field Party MAESHIRO, KAKU, RADOVICH

Type of Boring AUGER (MOBILE B-30) Diam. 4"

Elev. 68'± * Datum —

Drill Bit T.C. DRAG

Water Level	NOT NOTICED				
Time	—				
Date	10-21-71				

Unified Soil Classification	DESCRIPTION	Depth (Ft.)	Sampler	Sample No.	Plastic Limit	Water Cont. %	Liquid Limit	Unconf. Comp. P.S.F.	Vane Shear P.S.F.	PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40
	ELEV. = 68'± *	0								
	BROWN, SILTY CLAY W/GRAVEL & CORAL (FILL)									
ML	MEDIUM, BROWN CLAYEY SILT W/TRACES OF ASH			5-A	—	34	—	—	—	
ML	STIFF, BROWN CLAYEY SILT W/TRACES OF DEC. ROCK	5		5-B	—	31	—	—	—	
(MH-CH)	STIFF, BROWN & GRAY SILTY CLAY W/TRACES OF DECOMPOSED ROCK	10		5-C	—	28	—	—	—	
		15		5-D	—	38	—	—	—	30/.3'
	GRAY BROWN DECOMPOSED ROCK	20		5-E	—	35	—	—	—	30/.2'
		25		5-F	—	34	—	—	—	35/.3'
	BROWN DECOMPOSED ROCK	30		5-G	—	30	—	—	—	60/.4'
	END OF BORING @ 30.4'									

STIFF DRILLING

* ELEVATION ESTIMATED FROM PROFILE DATED AUG. 10, 1971

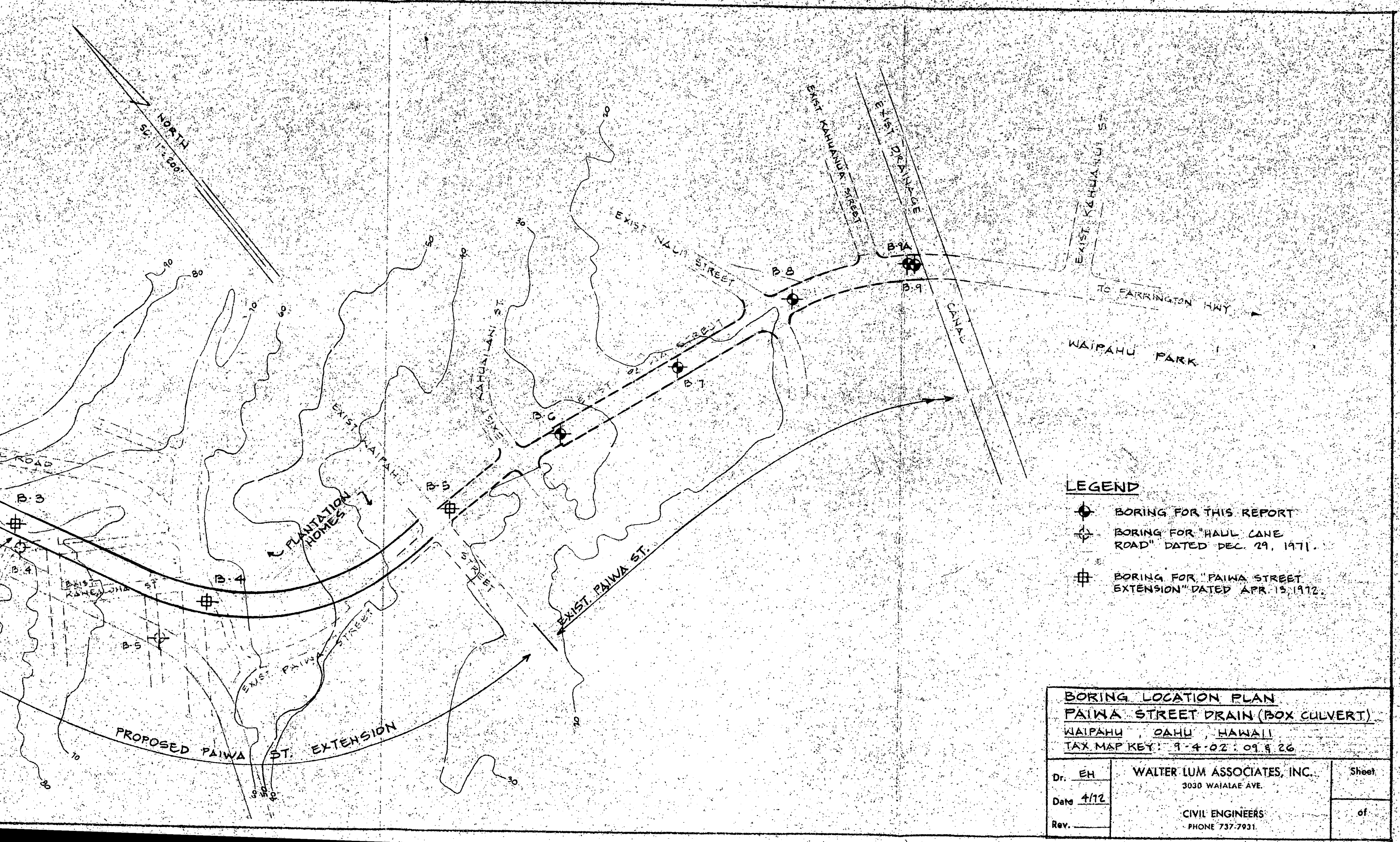
LIMITATIONS

In general, soil formations are commonly erratic and rarely uniform or regular. The boring logs indicate the approximate subsurface soil conditions encountered only at the drill holes where the borings were made at the times designated on the logs and may not represent conditions at other locations or at other dates. Soil conditions and water levels may change with the passage of time and construction methods or improvements at the site.

During construction, should subsurface conditions much different from those in the borings be observed, encountered, or otherwise indicated, we should be advised immediately to review or reconsider our recommendations in light of the new developments.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes, plan changes, or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the recommendations considering the time lapse and the changed conditions.

Our professional services were performed, findings obtained and recommendations prepared in accordance with generally accepted engineering practices. This warranty is in lieu of all other warranties expressed or implied.



LEGEND

- BORING FOR THIS REPORT
- BORING FOR "HAUL LANE ROAD" DATED DEC. 29, 1971.
- BORING FOR "PAIWA STREET EXTENSION" DATED APR. 15, 1972.

BORING LOCATION PLAN
PAIWA STREET DRAIN (BOX CULVERT)
WAIPAHU, OAHU, HAWAII
TAX MAP KEY: 9-4-02: 09 & 26

Dr. EH	WALTER LUM ASSOCIATES, INC.	Sheet
Date 4/72	3030 WAIALAE AVE.	
Rev.	CIVIL ENGINEERS	of
	PHONE 737-7931	